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Sir:

Transmitted herewith for filing is the patent application of **DAN KALISH, et al.** entitled **METHOD OF NAVIGATING THROUGH CONTENT OF CELLULAR NETWORK**

Application Elements:

- ☒ Specification (24 pages), Claims (6 pages / 23 claims) & Abstract (1 page) Total Pages 26
- ☒ Drawing(s) Total Sheets 15
- ☒ Oath or Declaration
- ☒ Power of Attorney
- ☒ Assignment(s) to **NIRAGONGO, INC.**
- ☒ Certified copy of _____ the priority of which is claimed under 35 USC 119
- ☒ Applicant claims small entity status. See 37 CFR 1.27
- ☒ Information Disclosure Statement, PTO-1449 and _____ references
- ☒ Return Receipt Post Card
- ☒ The filing fee has been calculated as shown below:

	# of Claims filed	Extra	SMALL ENTITY	Extra	LARGE ENTITY
Basic Fee			\$ 355.		\$ 690.
Total Claims	23 - 20 = 3	3 x \$9. = 27	\$ 27	0 x \$18. =	\$0.
Indep. Claims	4 - 3 = 1	1 x \$40. = 0	\$ 0	0 x \$80. =	\$0.
Multiple Dep Claim?	0	2 x \$135 = 0	\$ 270	0 x \$270. =	\$0.
		Total Filing Fee	\$ 652		\$0.

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- ☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.

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- ☒ Any additional filing fees required under 37 CFR 1.17.
- ☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.

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METHOD OF NAVIGATING THROUGH CONTENT OF CELLULAR NETWORK

BACKGROUND OF THE INVENTION

The present invention relates to wireless networks navigating practices. More specifically, the invention relates to methodologies and utilities for exploring and orienting through content of wireless networks.

WAP defines a communications protocol as well as an application environment. In essence, it is a standardized technology for cross-platform, distributed computing. WAP is very similar to the combination of TCP/IP and HTTP except that it adds in one very important feature: optimization for low-bandwidth, low-memory, and low-display capability environments. These types of environments include PDAs, wireless phones, pagers, and virtually any other communications device.

WAP client applications make requests very similar in concept to the URL concept in use on the Web. As a general example, consider the following explanation (exact details may vary on a vendor-to-vendor basis). A WAP request is routed through a WAP gateway, which acts as an intermediary between the "bearer" used by the client (GSM, CDMA, TDMA, etc.) and the computing network that the WAP gateway resides on (The Internet in most cases). The gateway then passes the request as an HTTP request to a server on the computing network. The said server retrieves contents or calls CGI scripts, Java servlets, or some other dynamic mechanism, then formats data for return to the client. This data is formatted as WML (Wireless Markup Language), a markup language based directly on XML.

Once the WML content (known as a deck) has been prepared, the gateway then sends the completed request back (in binary form due to bandwidth restrictions) to the client for display and/or processing. The client retrieves the first card off of the deck and displays it on the monitor.

The deck of cards metaphor is designed specifically to take advantage of small display areas on handheld devices. Instead of continually requesting and retrieving cards (the WML equivalent of HTML pages), each client request results in the retrieval of a deck of one or more cards. The client device can employ logic via embedded WML Script (the WAP equivalent of client-side JavaScript) for intelligently processing these cards and the resultant user inputs.

To sum up, the client makes a request. This request is received by a WAP gateway that then processes the request and formulates a reply using WML.

When ready, the WML is sent back to the client for display. As mentioned earlier, this is very similar in concept to the standard stateless HTTP transaction involving client Web browsers.

As known, when conventionally surfing through the web, the user navigates easily from one web page to another using the browser navigation utilities such as back and next, in contrast, when surfing through wireless networks using micro-browsers on constrained devices, e.g. wireless phones, even basic navigation utilities are not available since Wireless phones have size, weight and cost constraints which limit the memory and processing capabilities they possess. Furthermore, the diversity of devices and of user interfaces of micro-browsers (menus buttons etc.) creates a situation where the user is highly dependant on the actual content provided in the WML deck for his orientation and navigation.

As a result of these navigation constraints the users are generally restricted to the content provided by wireless communication and content suppliers. In most cases the user is enabled to navigate only to content

providers having commercial engagements with the wireless communication suppliers. As a result cross-site navigation is virtually impossible.

Furthermore the navigation constraints make simple surfing activities almost impossible, for example the option of going through a search result or any list of links. Once selecting a link there is no promise to the user that the content he is directed to will feature a “back” button. Thus when following a link he may be rendered unable to return to the list he was going through.

It is thus the prime object of the invention to provide a method and system for maximizing the Internet access capabilities of these wireless phone devices and various other constrained devices while maintaining a small memory and CPU footprint.

It is thus a further object of the invention to provide navigation utilities enabling efficient navigation through a wireless network or when using various constrained navigation devices.

It is a further object of the invention to provide a method of accelerating the delivery of content to the user of such network

SUMMARY OF THE INVENTION

A method of navigating and orienting through network hypertext language based pages ("network page") using designated mobile device for displaying network page content and enabling user interaction comprising the steps of:

- 5 Aggregating any collection of network pages ("track pages") and arranging them into sequences of network pages' URLs ("navigation track"), placing navigation track at accessible memory location on the network ("navigation track source"), loading navigation track from navigation track source, setting a value code to maintain current user location ("track location-code") to the first
- 10 page of the navigation track, downloading track page data according to current track location-code, editing current track page hypertext content: ("modified track page")

- (1) Adding hypertext navigation items linking to navigation options
- (2) Exchanging URLs' references of embedded objects to absolute
- 15 URL references;
- (3) Adding further hyper text language content ("added content")

Sending the modified current track page content to the user display, presenting in mobile device screen respective information based on the current track page content, enabling user interaction, to select navigation

20 option, based upon embedded navigation items to permit navigation through navigation track, Enabling user access to the added content, upon selecting navigation option by the user, identifying navigation target address, downloading the respective page content and further editing and processing the page content as described above.

BRIEF DESCRIPTION OF THE DRAWINGS

These and further features and advantages of the invention will become more clearly understood in the light of the ensuing description of a few preferred embodiments thereof, given by way of example only, with
5 reference to the accompanying drawings, wherein-

Fig. 1 is a general diagrammatic representation of the environment in which the present invention is practiced;

Fig. 2 is a flow-chart of page pre-processing according to the present invention;

10 Fig. 3 is a flow-chart of starting track-navigation process without caching;

Fig. 4 is a flow-chart of processing for each user request;

Fig. 5 is a flow chart of processing done for a user track navigation request. E.g. "Next"/"Previous";

15 Fig. 6 is a flow-chart of processing done for a user request of following a link of the hypermedia source;

Fig. 7 is a flow-chart of processing done for a user request to view the navigational track;

Fig. 8 is a flow-chart of processing done for a user request to re-load the current trail sequence from the source of the track sequence;

20 Fig. 9 is a flow-chart of starting trail-navigation process with caching and pre-fetching of pages;

Fig. 10 is a flow-chart of processing for each user request with caching and pre-fetching of pages;

Fig. 11 is a flow chart of processing done for a user trail navigation request. E.g. "Next"/"Previous" with caching and pre-fetching of pages;

Fig. 12 is a flow-chart of processing done for a user request of following a link of the current hypermedia source with caching and pre-fetching of pages;

Fig. 13 is a flow-chart of processing done for a user request to view the navigational trail with caching and pre-fetching of pages;

Fig. 14 is a flow-chart of processing done for a user request to re-load the current trail sequence from the source of the trail sequence with caching and pre-fetching of pages;

Fig. 15 is a flow-chart of processing done to allow further client acceleration through concatenation of WML cards into larger decks;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 illustrates one possible network configuration, in which the present invention can be implemented.

Referring to Fig. 1 of the drawings, it will be seen that a user A is
5 connected through cellular network B to designated server (hereinafter called "the navigation server"), this server serves as an intermediary gateway between the user mobile device (hereinafter called "the user agent") and the Internet web servers containing data available for user access (hereinafter called "the original server").

10 Let us assume that the user A has placed a request for a hypertext based data file (hereinafter called the "track page"), (the most common standard for cellular networks is a WML page) which is part of a designated dynamic track (hereinafter called the "navigational track") initiated by the navigation server.

15 Navigational tracks, i.e. pre-set sequences of hypermedia sources, are necessary for the implementation of the navigation method of the present invention. However, although being pre-set at the actual time of navigation, these sequences need not be determined until such time as they are to be used. Such pre-set of sequences can originate from various sources:

- 20 1. Man-made sequence: This sequence may be prepared on a general-purpose computer using traditional navigation utilities (e.g. Web Browser Software). Alternatively the sequence may be entered from the constrained device either by way of keying in each nodes data or by way of a provision amongst the navigational aids for selecting
25 designated or current URL as a node in the sequence. For example

such a track of hypermedia links might be the persons personal information services e.g. stocks, local weather, etc.

2. Mechanically produced on demand resource locators (on demand track): A group of resource locators may be provided in form of a hypermedia source, or in any other computerized media and format accessible to the navigation server at the time of track creation. For clarity, take the example of location-based services for mobile users. For instance a person roaming the streets with a mobile hand set might want to view a sequence of upscale restaurants in his vicinity. Given a computerized service capable of providing the raw data comprising required restaurants, for instance by way of database query provided users location and required class of restaurants, a navigational trail may be created on the fly from said query result.
3. Search results: In this case the required collection of hypermedia links may be extracted from the hypermedia source that is the final output of the search engine, or from any intermediate interior representation of said collection of links, such as a database query result.
4. Any network information source: transformed, for or by the navigation server, into the hypermedia format appropriate for the user agent. An example of such implementation might be a users email inbox, from which each individual email can be accessed, if necessary translated into appropriate hypermedia representation, and linked together with all the other emails to form a trail. Thus enabling the user to browse conveniently and in an accelerated manner through his/her pending mail.

25

According to the prior art routine, when a user places a request for a WML page through wireless network, after receiving the requested page, the navigation capabilities were limited. The user can't always back trace his foot steps or easily go through a list of hyperlinks. Once the user selected one hyperlink it is not promised that he can return to the original hyperlinks list in one or two click operation.

Taking into consideration that a certain time lag is involved in downloading each WML page it will be appreciated that this process is cumbersome and time consuming.

Accordingly, it is herein proposed that before transmitting the track page through the wireless network the page is modified according to the process illustrated in Fig.2 (hereinafter call "the Editing Process"). The editing process serves two major purposes: first, to add navigation provisions into the original page, providing the user with various one click navigation utilities such as next or back buttons, more advanced utilities are described further bellow. Second, editing the hyperlinks URLs of the original page to force their targeted hyperlink page to be passed to the navigation server. As a result the hyperlink target page will be modified according to said editing process. This procedure enables the user to keep the one click added navigation utilities, even when navigating outside of the pre-planned navigation track.

The first purpose, that of adding navigation provisions, is achieved by operation A as illustrated in Fig 2.

Operation A is at the heart of the navigation provisioning. This is the process in which navigation elements are added to the hypertext source to allow for it to be presented as part of the track context.

There are several possible ways for implementing the added provisions depending on the specific markup language in use, on the data transfer protocol, and on the capabilities of the said navigational device.

For the sake of clarity we shall detail one such possible implementation, detailed in a constellation where WML is used as markup language, WAP protocol for data transfer and the WAP enabled mobile phone as navigational device in which the programming and storage capabilities of the device are constrained (such that the management of the navigation process is best handled on the server.)

First possible added provision is "Next" utility, which might be implemented as a navigation item addressed to the Navigation Server application, this navigation item comprises a first code representing the current location of the user amongst the track nodes and a second code representing the request of moving forward along the navigational track. According to alternative way, the navigation server might maintain an internal state indicating the user's current location within the navigation track (a current location code), the current location code can be extracted from any of a variety of user identifying characteristics (e.g. ISDN number, session id, SIM, and so forth, all dependant on the availability of such) coupled with the current location code of said user. The server in response to such forward request would alter the current location code to represent the new user agent location, and would return to the user the WML page appropriate for the new location.

In the above said constellation a "Show map" utility (as described down bellow) could be implemented as a navigation item addressed to the Navigation Server application, where the navigation item comprises a first code representing the current location of the user amongst the track nodes and a second code represents the request for viewing the map of the track. Alternatively the above-mentioned user identification mechanisms are applicable. The server, in response to such request, would prepare a WML deck representing the navigational track ("track map page") and return the latter to the user device. The track map page would contain links representing navigation track nodes, where each node's link would pass to the Navigation Server a request comprising a first code representing the request for relocating the user agent to this node and a second code representing the requested new location of the user. The server in response to such request would alter its current location code to represent the new user agent location and would return the WML page associated with the new location to the user.

In the above said constellation said "Reload track" utility (as described down bellow) could be implemented as a navigation item addressed to the Navigation Server application, where the navigation item comprises a code representing the users request to reload the current navigation track. The

server in response to request would again perform the process by which the current track was originally composed. Might this be loading a pre-prepared static representation of the navigation track, or any sequence of queries or procedures performed to comprise said track, as described above in section 5 dealing with sources for navigational track.

The second purpose, that of redirecting the links, is achieved by operation B.

In the navigational provisioning described in this document, maintaining user orientation along the entire navigation process is an important feature. Given that the method described herein permits constraint-free navigation by following all hyper-media links of potential hypertext sources, a method is provided for maintaining said navigational orientation and navigational provisions for all hyper-media links accessible along the navigation session.

Operation B provides method for such context maintenance. In this modification process, the hypermedia source is scanned for detecting all elements of the markup language (appropriate for said hypermedia source) enabling redirection of the user agent to an alternate hypermedia source. Said hypermedia links are each replaced with a request to the navigation server, in which the alternate hypermedia source location identifier is passed as a parameter to the server. The server in response to such "Follow-link" request would retrieve requested hypermedia source, specified by parameter, from designated server and perform on it the same process described herein. There are several possible ways for implementing the described process depending on the specific markup language in use, on the data transfer protocol, and on the capabilities of the said navigational device. For the sake of clarity we shall detail one such possible implementation, wherein WML is the markup language, WAP is the transfer protocol used for data transfer and WAP enabled mobile phone as navigational device in which the programming and storage capabilities are constrained (such that the management of the navigation process is best handled on the server.)

In this constellation all WML elements of the WML deck being loaded and which enable loading of a new URL will be searched and replaced. Each relative URL would first be expanded to absolute form and would be passed as a parameter in a substituted URL pointing to the Navigation Server application. Upon receipt of such a request the navigation server would retrieve the original URL parameter from the request and read the requested WML source from the designated server. The server would then perform on the source the same process described herein and return the resulting WML deck to the user, thus maintaining the user context and navigation provisions.

10

The above actions are complemented by operation C as illustrated in Fig 2.

The above-mentioned modifications of processes A and B provide for user navigational aids and for maintaining user context while allowing free surfing in and out of the trail. For these processes all requests of the user agent are directed at the Navigation Server. In the hypermedia source there might be references to embedded objects that need not be accessed through the Navigation Server. In such case, since these embedded objects might be bundled on a computer with the original hypermedia source, the user agent may by its default behavior request them from the Navigation Server. To alleviate unnecessary traffic through the Navigation Server, and to expedite these embedded objects delivery, the hypermedia source may be altered in such a way as to instruct the user agent to retrieve said embedded objects from the original server from where the hypermedia source was retrieved.

According to alternative mode of operation C enabling to achieve acceleration of downloading embedded objects, by caching them at the navigation server together with the hypermedia source in which they are embedded, the navigation server may retrieve the embedded objects when they are encountered in the hypermedia source and cache them locally. As the user agent requests these embedded objects, they may be provided to the user agent from the cache of the Navigation Server. In such case the

hypermedia links of said embedded objects would not be altered to instruct the user agent to retrieve said embedded objects from the original server.

For the purpose of clarity and exemplification, in the constellation described for modifications A and B above, such embedded objects would be
5 image elements of the WML source, denoted by the WML tag. In order to instruct the user agent to extract such embedded images directly from the original WML server, the URL denoting the source from which to read the image (as represented by the "ref" attribute of the tag) would need to be replaced with the corresponding absolute URL reference to the image
10 source.

For example let us assume that the user has chosen an on-demand track of WML pages, the procedure as illustrated in Fig 3, takes place. The Navigation Server receives the users request for a track category. The server
15 generates a dynamic sequence of WML page URLs adjusted according to up-to-date time and place, and user personal preferences. Let us assume the user requested a tour of restaurants in his vicinity, hence the sever will generate a track of WML pages providing the user with information of near by Italian (according to the user preference) restaurants open at the current time.
20 The newly created track is decoded and temporarily maintained in the navigation server memory associated with requesting user's ID.

The tour category request can be further improved to serve for returning a search query. Once the navigating server receives query request, it is transmitted to appropriate search engine located on the original search
25 server. The result search list received by the navigation server is dynamically processed and a respective track comprising the search result URL's is created. Optionally before transmitting the first track page as described down

bellow the track map is transmitted in the form of WML page containing
hyperlinks, this page is processed according to the Editing Process. This
enable direct access to any of the returned URL's of the search result while
keeping the user in the context of the track. A further proposed improvement
5 to this concept is to enable the user to select multiple links from the page of
search hyperlinks. Upon completion of such selection, a navigation track is
produced containing only the user-selected search results. Thus enabling the
user to traverse only those hyperlinks that are of interest to him/her.

The first track page is downloaded from the original web server to the
10 navigation server and processed according to the Editing Process. The
modified track page is transmitted to the user through the wireless network.

Once provided with modified track page the user has four alternatives
(equivalent to respective added provisions as described above) as illustrated
in Fig. 4. The first option for selecting one of the navigation buttons is
15 illustrated in Fig 5. Upon receiving the navigation request, the navigation
server identifies the respective track and traces user current position in the
track.

According to the respective track details, the users current position and the
users navigation request, the respective target track page is retrieved from
20 the original server. The target track page is modified according to the Editing
Process and transmitted to the user mobile device.

The second option of re-starting the track is illustrated in Fig 8, this
process is equivalent to the previous process, but the target track page is
always the first track page. Furthermore, the track itself is refreshed on the

server to provide for tracks that can change while the user is navigating, for instance due to time elapsing, location changing, or manual alteration of the track.

The third option provides the user with a map of the current track as illustrated in Fig 7. Upon receiving the user request, the navigation server produces a WML page representing the track stops, each stop representation acts as conventional hyperlink. A users selection of a map hyperlink will instruct the server to transfer the user to that node and context of the track. The map can be displayed as a simple list of links, as a tree directory, or as a directed graph wherein stops are represented by graph nodes, and the track direction by respective arrows. All as suitable for user preferences and to the rendering capabilities of the device.

The fourth option as illustrated in Fig 6 resembles the conventional way of selecting hyperlinks, however when selecting the hyperlinks the user is provided with the same navigation utilities as provided by a track page. After the user has placed a request to navigate to one of the hyperlinks the target page is processed according to Editing Process.

The editing process can take place at the navigation server or alternatively at the cellular device, depending on the cellular device processing-power and memory limitations.

According to a further improvement offered by the present invention, it is enabled that after downloading the first requested track page, the navigation server automatically pre-fetch the next in-line track pages, the downloaded pages are processed according to the Editing Process and maintained in the

cache memory of the navigation server. As a result, when the user requests the next track page or even a further page of the track, the navigating server checks the local cache, in case the requested page exists in cache memory it is instantly transmitted to the user. This improvement results in a much more efficient and fast process of providing the user with the requested track pages. The complete procedures of navigating according to this improvement are illustrated in Figs 9,10,11,12,13 and 14.

According to another improvement offered by the present invention, it is proposed to merge several track pages into one track page (hereinafter called the "united track page") in which all cards of several original track pages are integrated together. This integration process, as illustrated in Fig 15, is applied according to the memory limitation of user agent, the number of integrated pages is constrained by the memory capabilities of the user agent.

The advantages of this integration process are clear. Once the user requests the next-in-line track page, its content already exists in user-agent memory, the time lag of transferring the track page from the navigation server to the user agent is spared. Further more this process spares the need to apply the editing process separately to each track page, the editing process is applied only to the united track page.

Finally, it should be appreciated that the above-described embodiments are directed at a cellular communication environment. However, the invention in its broad aspect is equally applicable to computerized network communication in general, such as satellite, blue-tooth, and others.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplifications of the preferred embodiments. Those skilled in the art will envision other possible variations that are within its scope. Accordingly, the

5 scope of the invention should be determined not by the embodiments illustrated, but by the appended claims and their legal equivalents.

100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

WHAT IS CLAIMED IS:

1. A method of navigating and orienting through network hyper text language based pages ("network page") using designated mobile device for displaying network page content and enabling user interaction comprising the steps of:
 - 1st. Aggregating any collection of network pages ("track pages") and arranging them into sequences of network pages' URLs ("navigation track");
 - 2nd. Placing navigation track at accessible location on the network ("navigation track source")
 - 3rd. Loading navigation track from navigation track source;
 - 4th. Setting a code to denote current user location within the navigation track ("track location-code") to the first page of the navigation track;
 - 5th. Downloading track page data according to current track location-code;
 - 6th. Editing current track page hyper text content: ("modified track page")
 - F(1) Adding hypertext navigation items linking to navigation options;
 - F(2) Exchanging URLs' references of embedded objects to absolute URL references;
 - F(3) Adding further hypertext language content or command ("added hypertext")
 - 7th. Sending the modified current track page content to the user display;

8th. Presenting in mobile device screen respective information based on the current track page content;

9th. Enabling user interaction, to select navigation option, based upon embedded navigation items to permit navigation through navigation track;

10th. Enabling user access to the added hypertext content or command;

11th. Upon selecting navigation option by the user, identifying navigation target address;

12th. Start the process above from step E where the current track location-code is the navigation target address selected in K;

2. The method of claim 1 further comprising the step of: prior to loading the navigation track, updating navigation track according to current circumstances e.g. time or place;

3. The method of claim 1 further comprising the step of enabling the user to edit the navigation track e.g. delete any page;

4. The method of Claim 1 using a designated proxy server ("navigation server"), further comprising the steps of:

- Further editing of page hypertext content by modifying URLs of "hyperlinks" so as to point to the location of the navigation server;
- Upon selecting a hyperlink by the user, downloading the requested original page ("target page") by the navigation server;

- Editing the target page hyper-text content according to step F of the first claim and the first step of claim 4; and
- Transferring the modified track page to the mobile device;

5. The method of claim 1 further comprising the steps of:

- Concurrently with downloading of the current track page in step E, further downloading the next-in-line pages along navigation track;
- Editing each downloaded track page according to the step F of claim 1 and first step of claim 4;
- Upon receiving request navigation target address of any track page, checking cache memory of navigation server for said track page;
- Sending the respective track page from the navigation server to the user mobile device if the navigation target address matches any of the track pages in the navigation server cache memory;

6. The method of claim 5 further comprising the steps of:

- Prior to editing the downloaded track pages, merging several track pages into one track page ("united track page") wherein the size of the united track page is limited according to the mobile device constrains;
- Editing united track page according to the step F of claim 1 and first step of claim 4;

- Sending the modified united track page to the user mobile device; and;
 - Displaying the respective track page, placed at the united track page, upon user request for target address matching one of the track pages of the united track page;
7. The method of claim 1 wherein the navigation item contains the current track location code and a second code denoting a request for moving to the next or previous track page along the navigation track;
 8. The method of claim 1 wherein the navigation item contains a code denoting a request to re-load the navigation track from the navigation track source and to update the location-code of the user agent to the first track;
 9. The method of claim 1 further comprising the step of generating a network page ("track map page") containing list of links where each link points at one of the track pages;
 10. The method of claim 9 wherein each of the navigation items contains a code denoting the appropriate track page location, further comprising the step of displaying the track map page at the user display;
 11. The method of claim 1 further comprising the step of modifying any network page ("modified network page") containing hyperlinks pointing at track pages by editing said hyperlinks so as to point to the location of the navigation server;

12. The method of claim 1 wherein the hypertext language is in WML format;
13. The method of claim 1 wherein the mobile device is a cellular phone device;
14. The method of claim 1 wherein the aggregating operation is performed by the user;
15. The method of claim 1 wherein the aggregating operation is performed by professional editors further comprising the step of placing the navigation track accessible to the users;
16. The method of claim 1 wherein the aggregation operation is processed and based on any dynamically created computer-generated collection of network pages ("dynamic page list").
17. The method of claim 16 further comprising the steps of:
- Presenting the user with the dynamic page list; and
 - Enabling the user to relocate directly to a location within the navigation track using the dynamic page list.
18. The method of claim 16 wherein the aggregation operation further comprises the steps of:
- Presenting the user with the dynamic page list;
 - Enabling the user to select multiple network pages from the dynamic page list.

- Upon completion of the user-selection, updating the dynamic page list to contain only said user-selected network pages .

19. The methods of claims 16, 17 and 18, wherein the dynamic page list is a search result list;

20. The methods of claims 16, 17 and 18, wherein the dynamic page list is an inbox mail list;

21. The method of claim 6 wherein each track page is a WML deck and the track pages are merged together into the united track page in the form of a deck containing cards collected from the different WML decks of the navigation track;

22. The method of claim 21 further comprising the step of displaying track pages locally in user agent from united deck upon user navigation requests to such pages;

23. The method of claim 21 further comprising the step of collecting WML pages until size of the united deck is optimized with respect to specific mobile device capabilities;

ABSTRACT

A method of navigating and orienting through network hypertext language based pages using mobile device is disclosed. Creating navigation track out of any collection of network pages arranged into sequences of network pages' URLs. Placing navigation track at accessible location on the network. Downloading first track page data and editing current track page hypertext content: by adding hypertext navigation items and exchanging URLs' references of embedded objects to absolute URL references. Sending and presenting the modified track page content to the user display and enabling user interaction, to select navigation option, based upon embedded navigation items to permit navigation through navigation track. Upon selecting navigation option by the user, identifying navigation target address and downloading the respective content.

Fig. 1 – System architecture

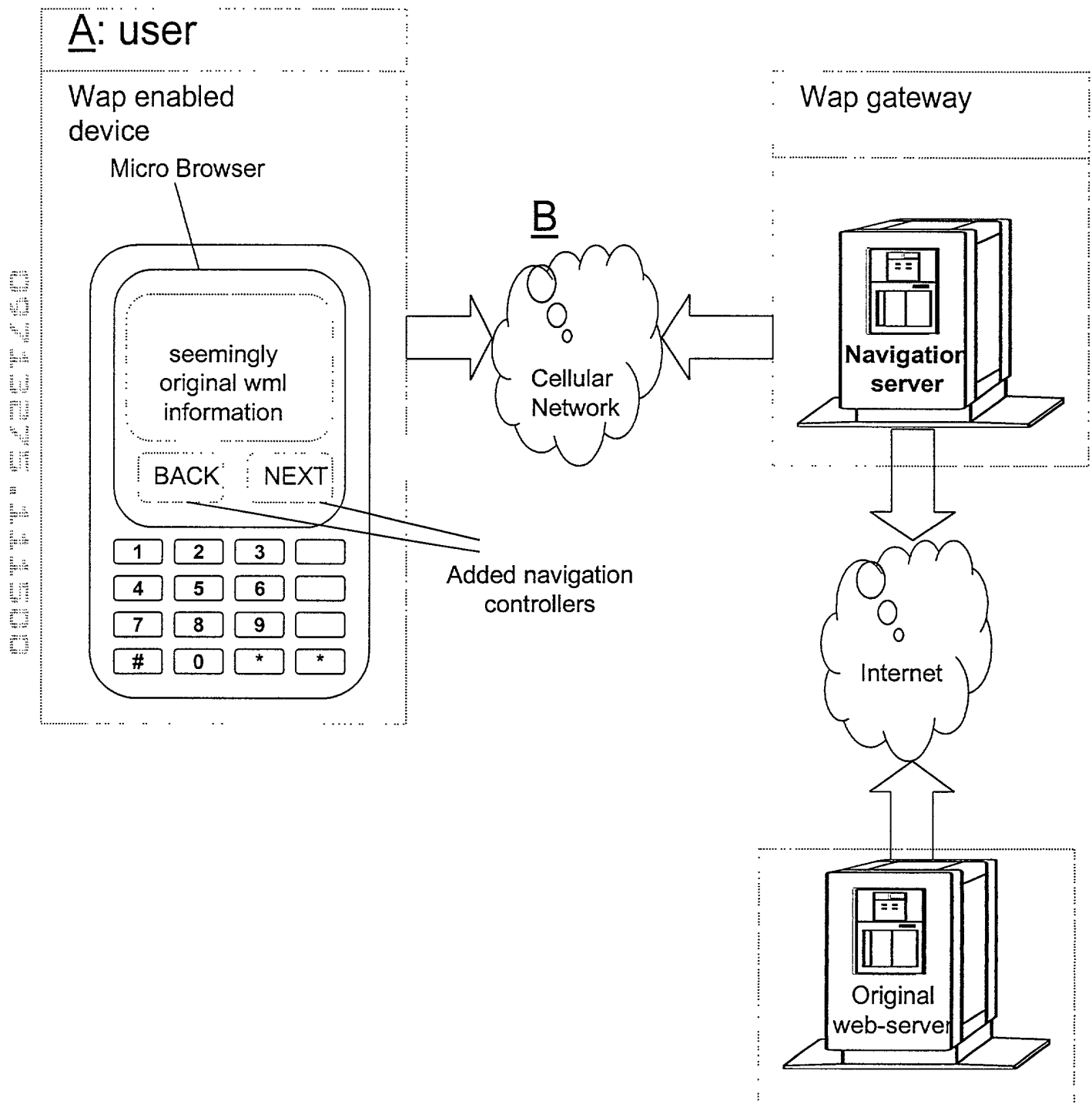


Fig. 2 – Page pre-processing

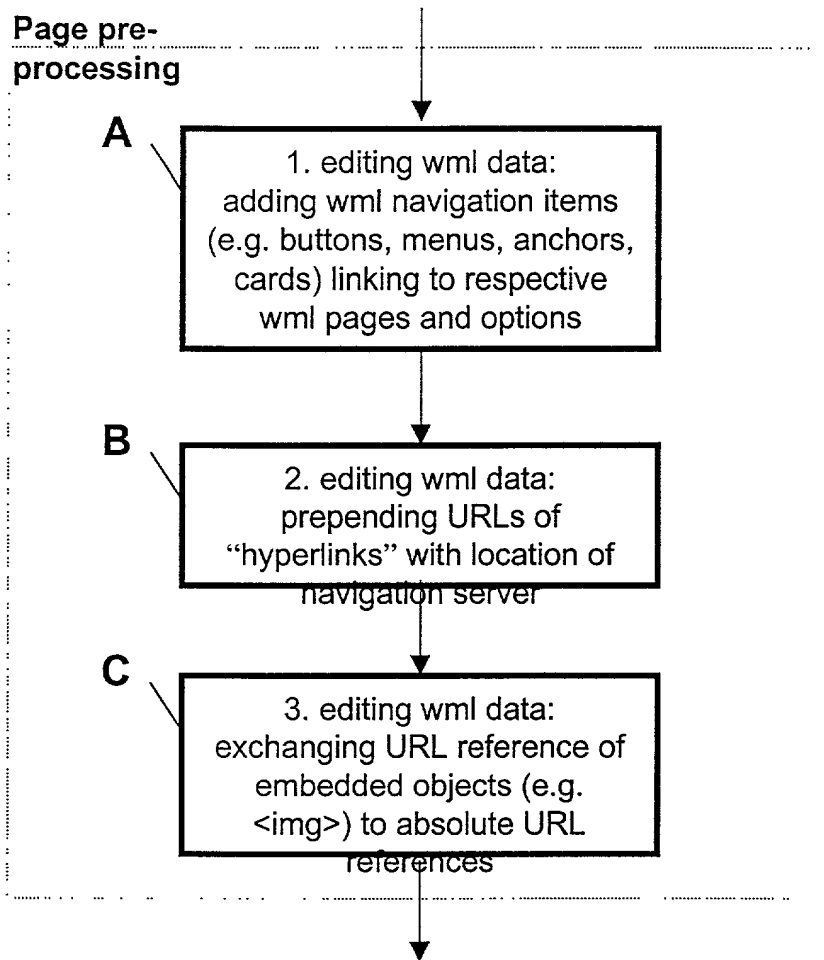


Fig. 3 – Start tour process, without page caching 3 of 15

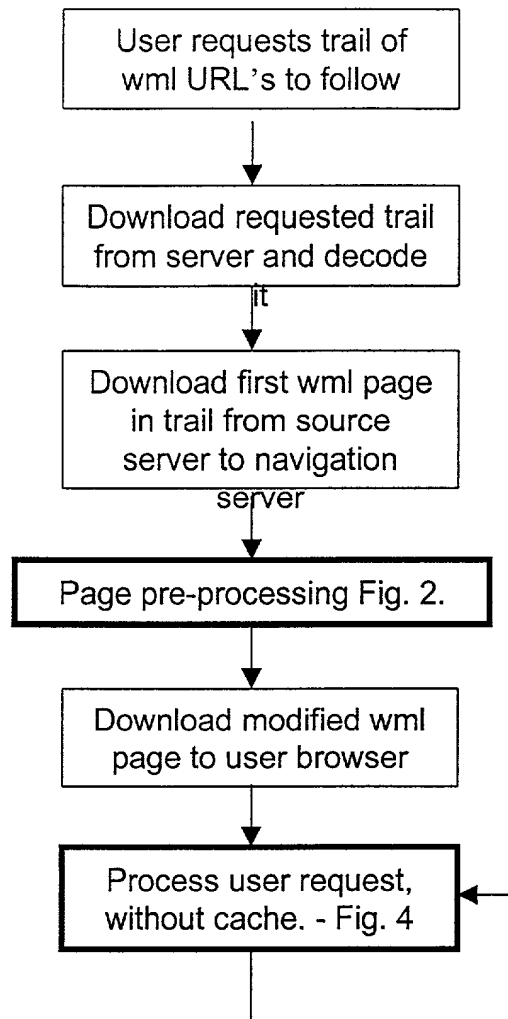


Fig. 4 – Process user request, without page caching^{4 of 15}

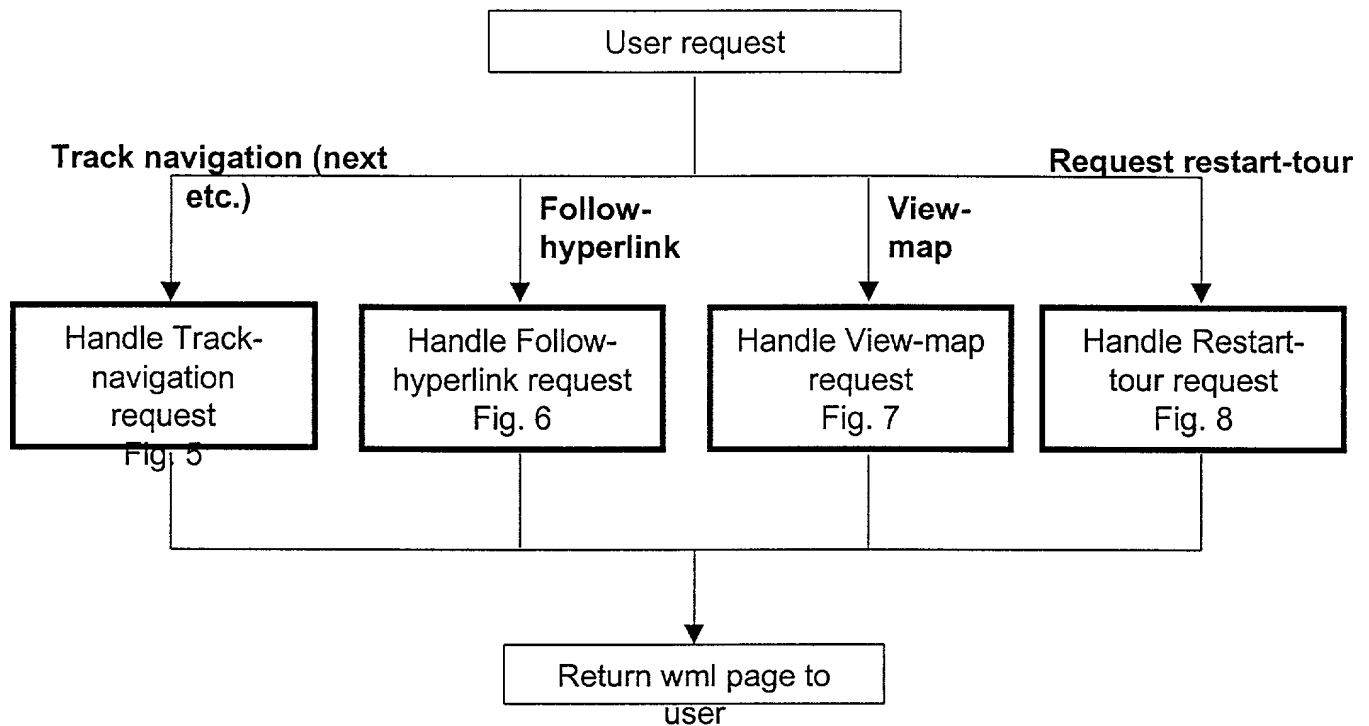


Fig. 5 – Process trail navigation request,
without page caching

Track navigation request (next
etc.)
Fig. 4

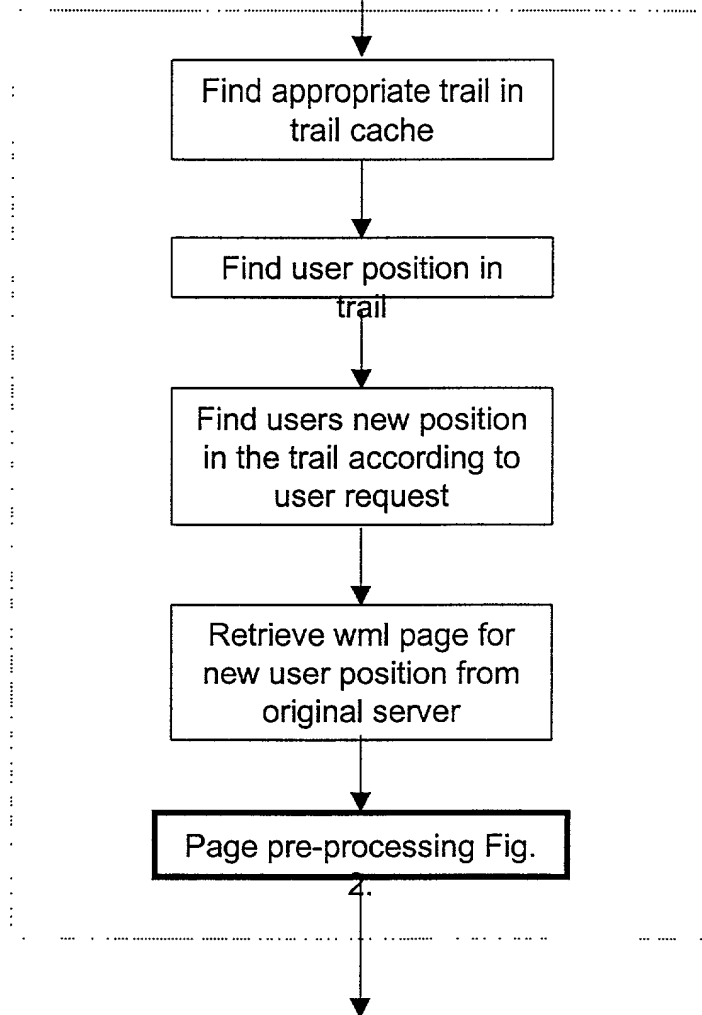


Fig. 6 – Process follow-hyperlink request,
without page caching

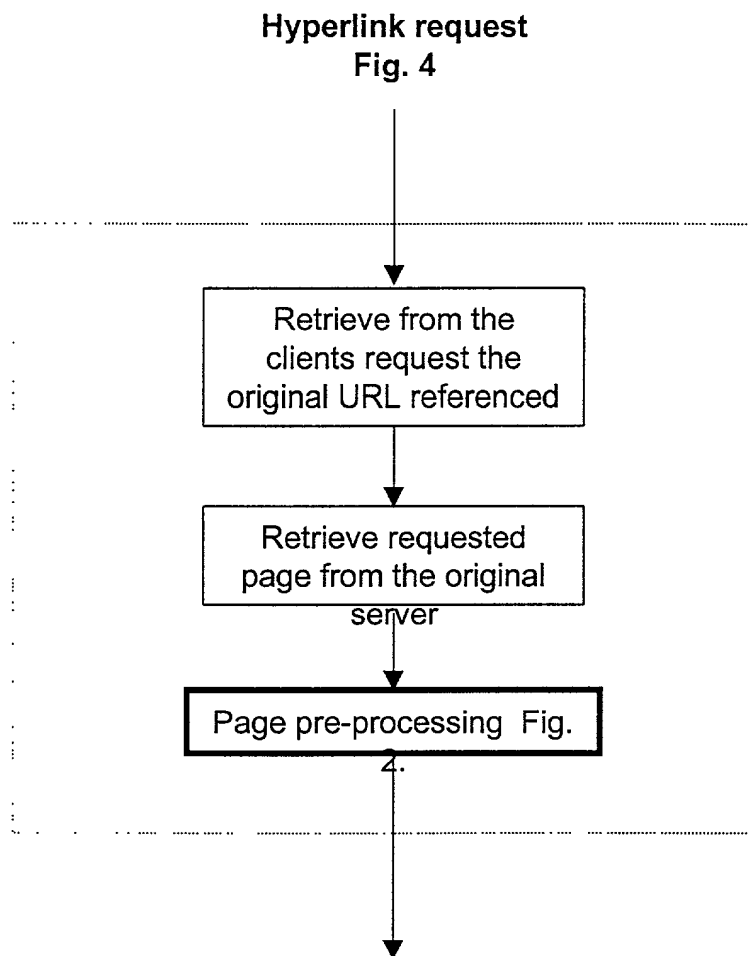


Fig. 7 – Process view-map request,
without page caching

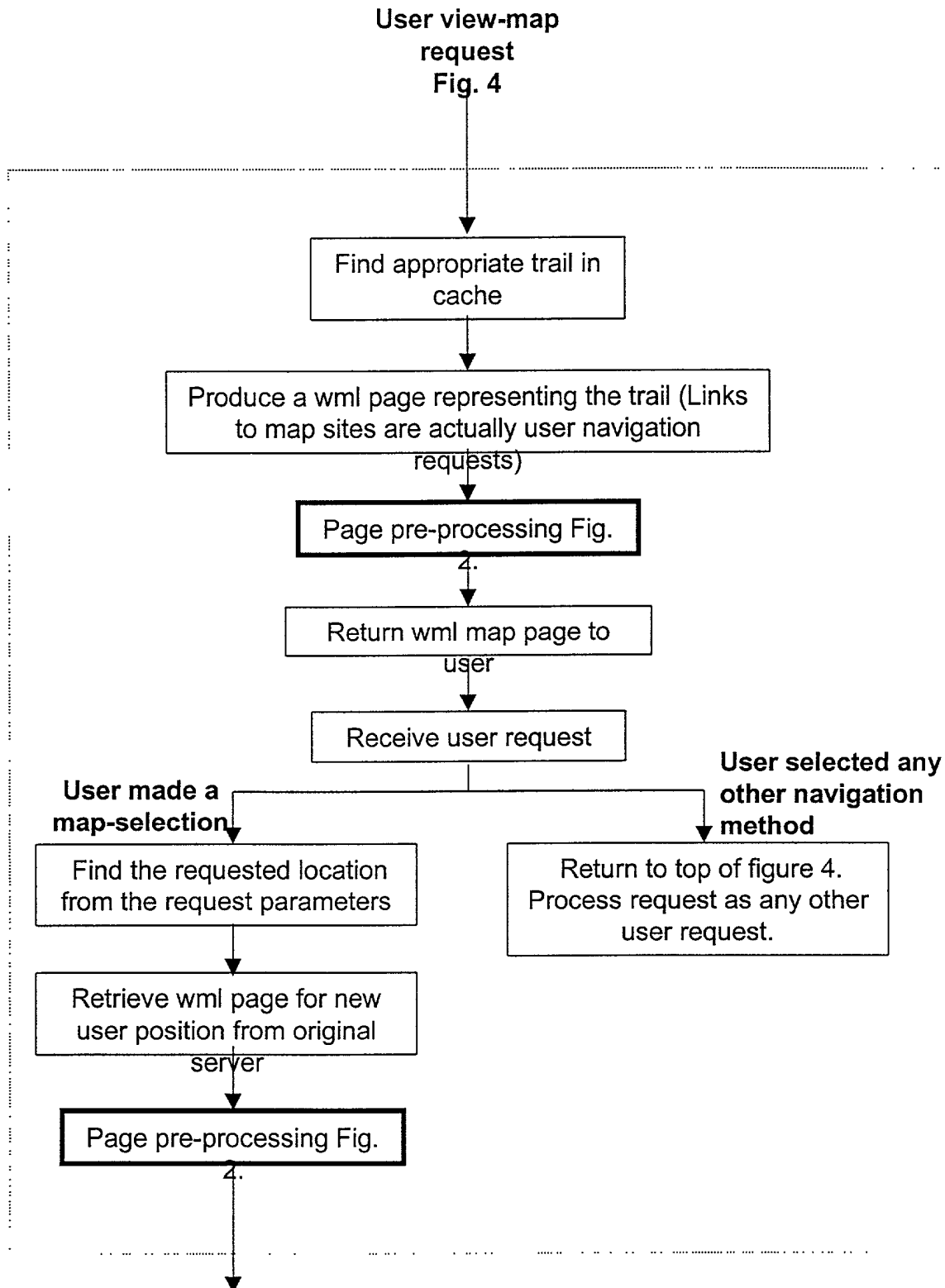


Fig. 8 – Process restart-tour request,
without page caching

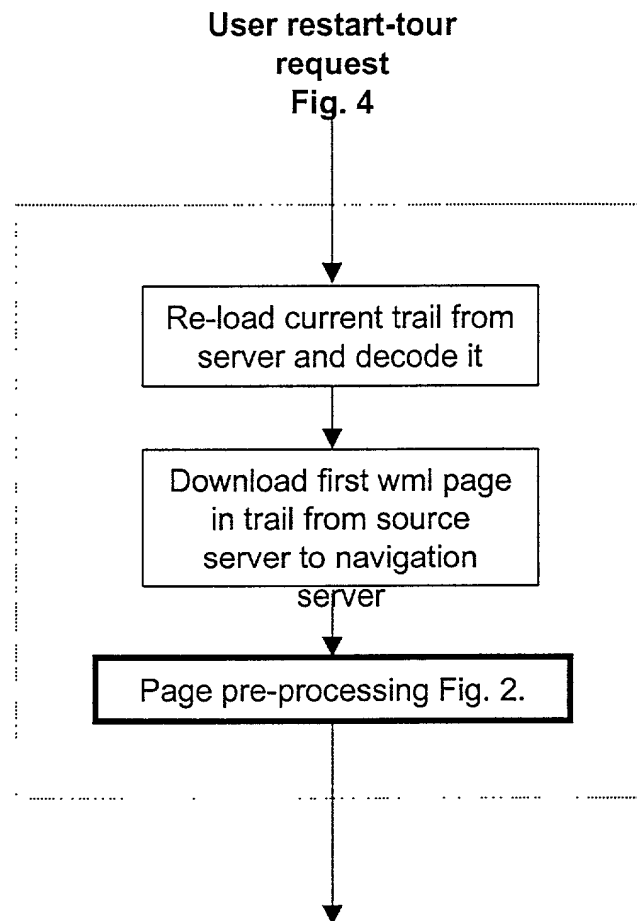


Fig. 9 – Start tour process, with page caching

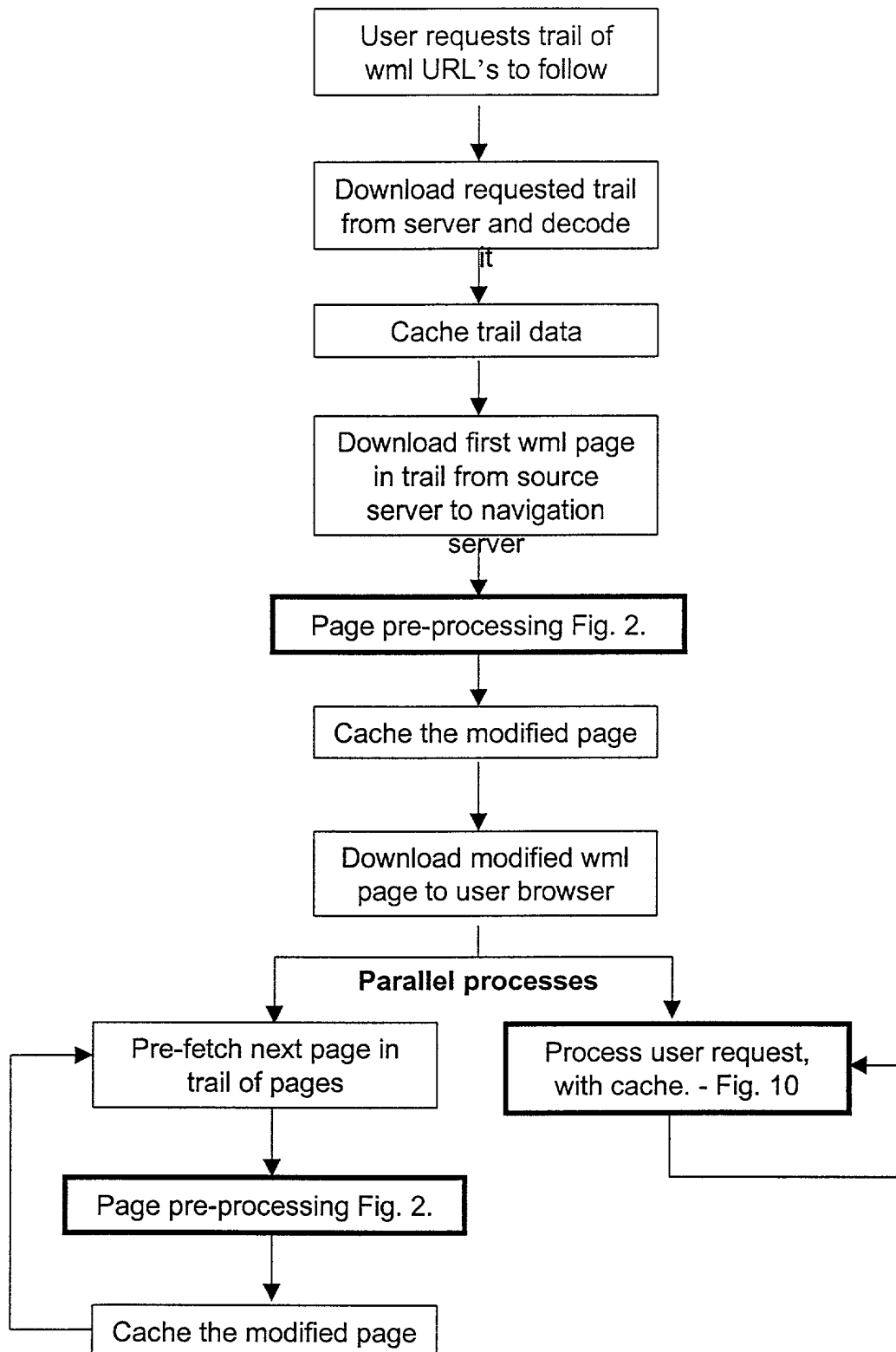


Fig. 10 – Process user request, with page caching

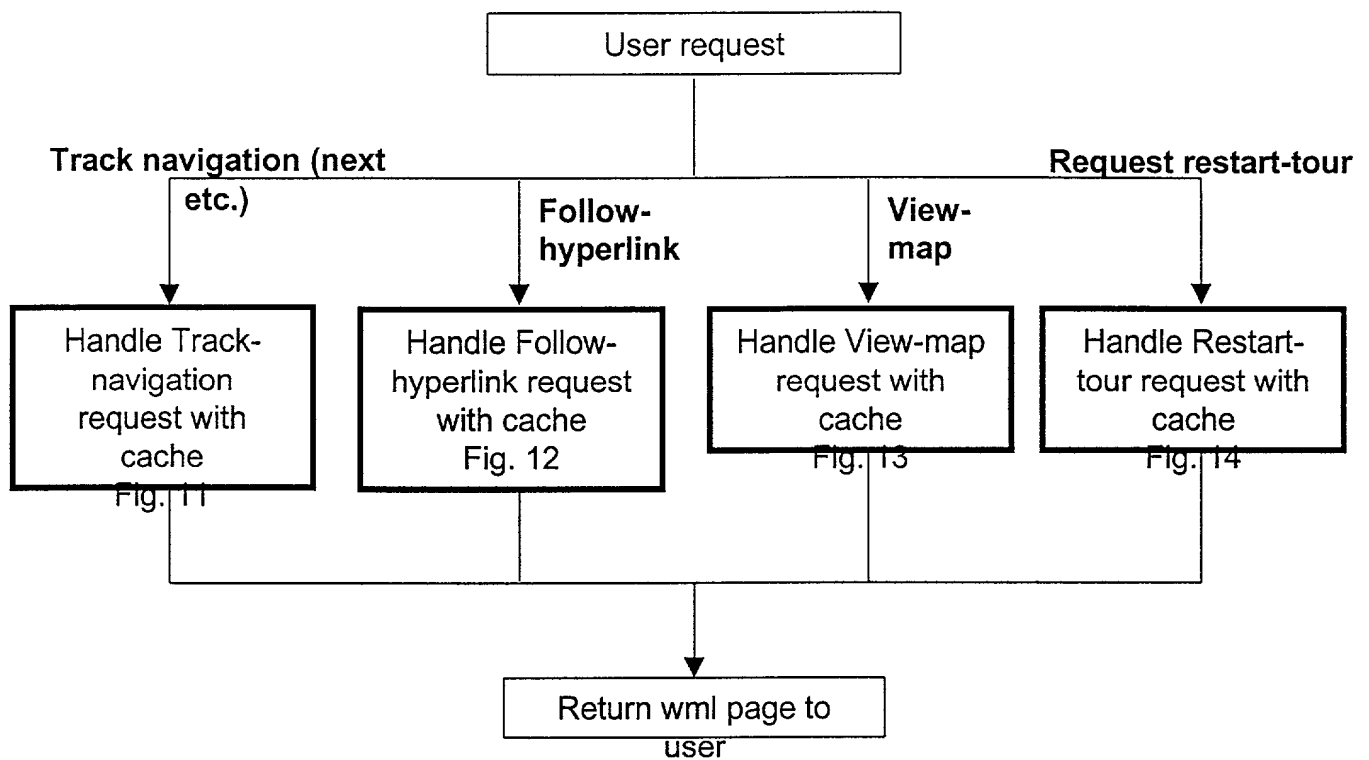


Fig. 11 – Process trail navigation request,
with page caching

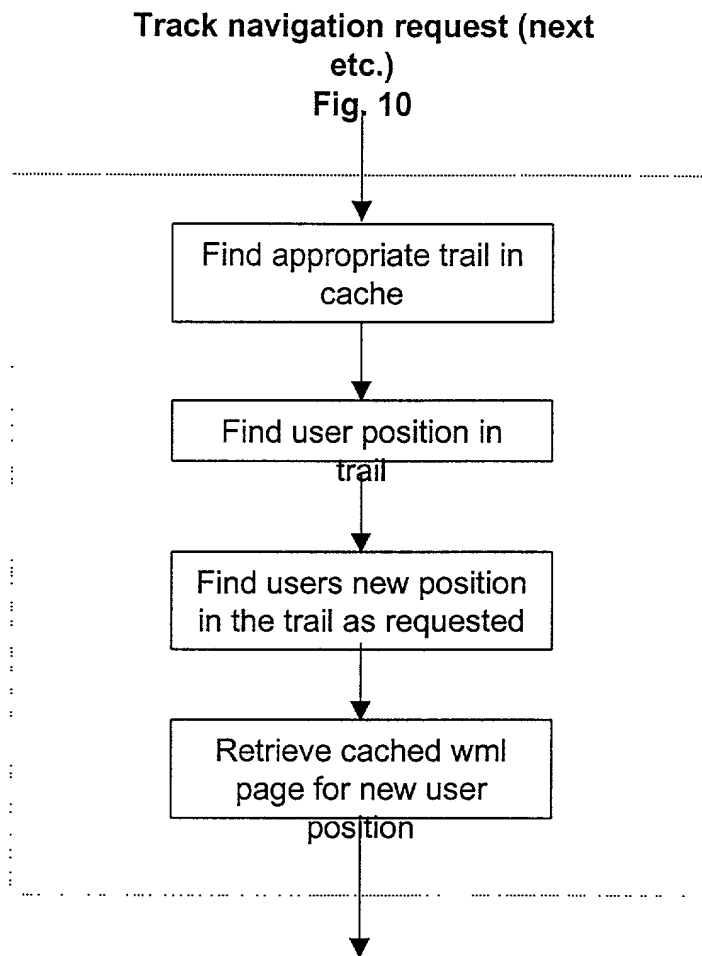


Fig. 12 – Process follow-hyperlink request,
with page caching

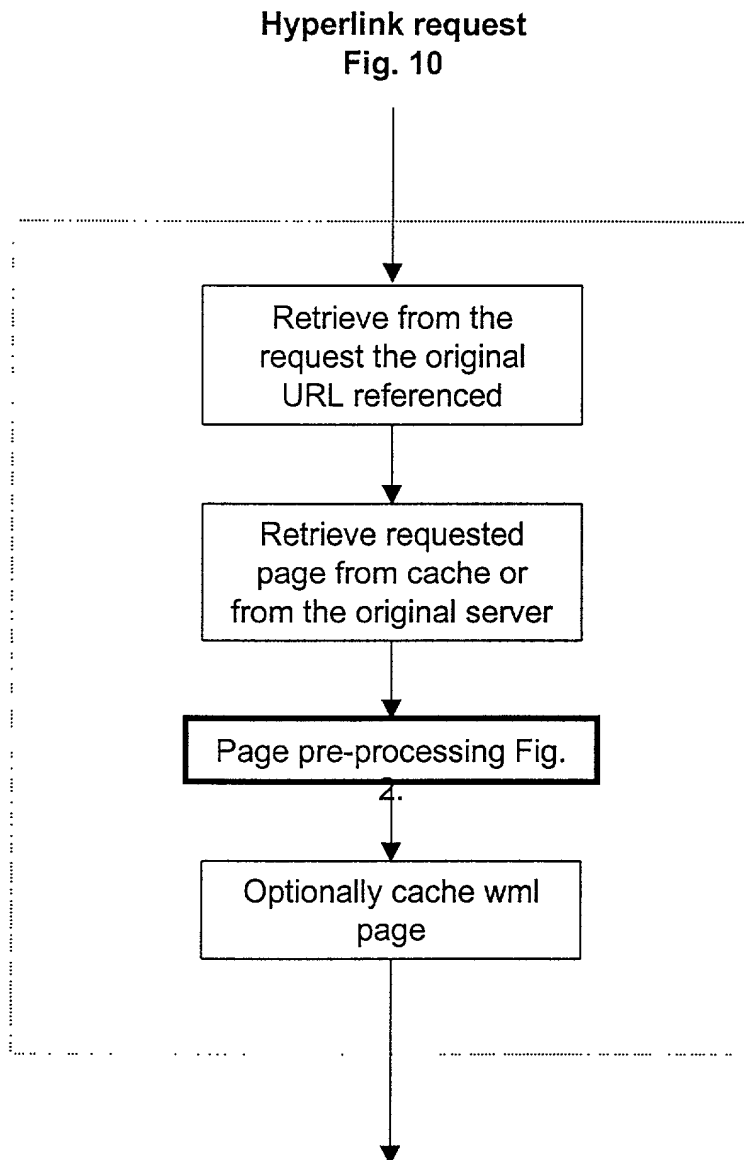


Fig. 13 – Process view-map request,
with page caching

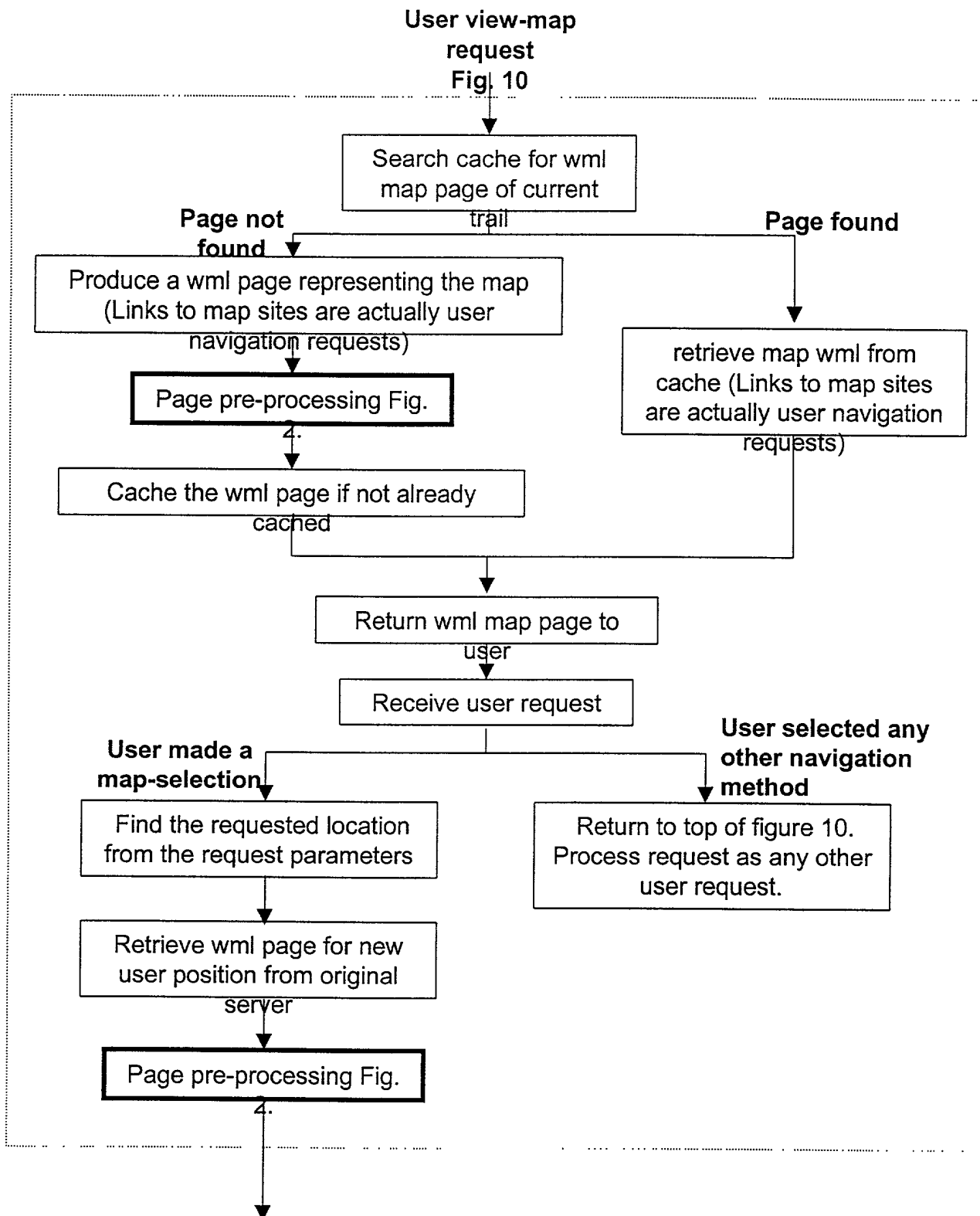


Fig. 14 – Process restart-tour request,
with page caching

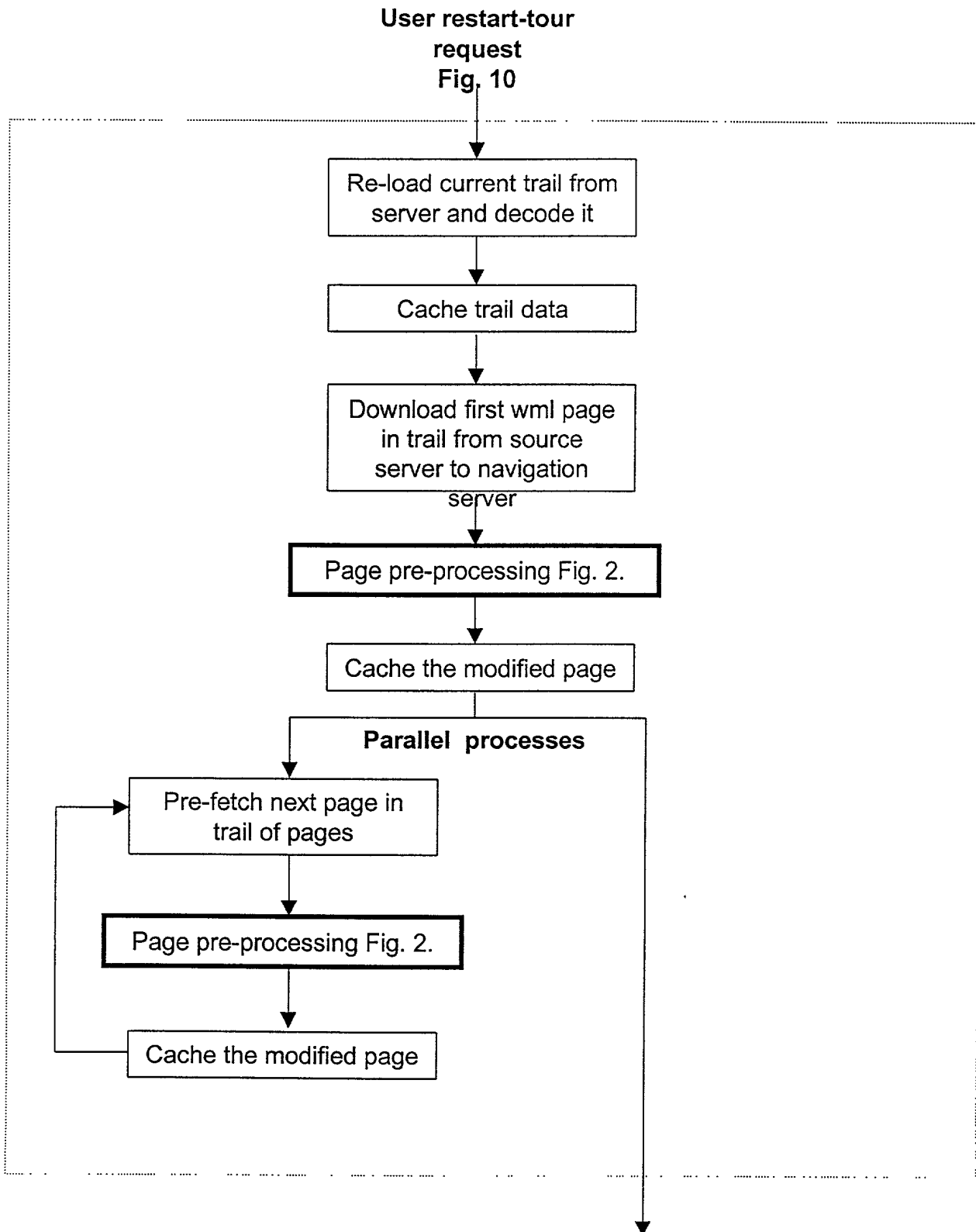
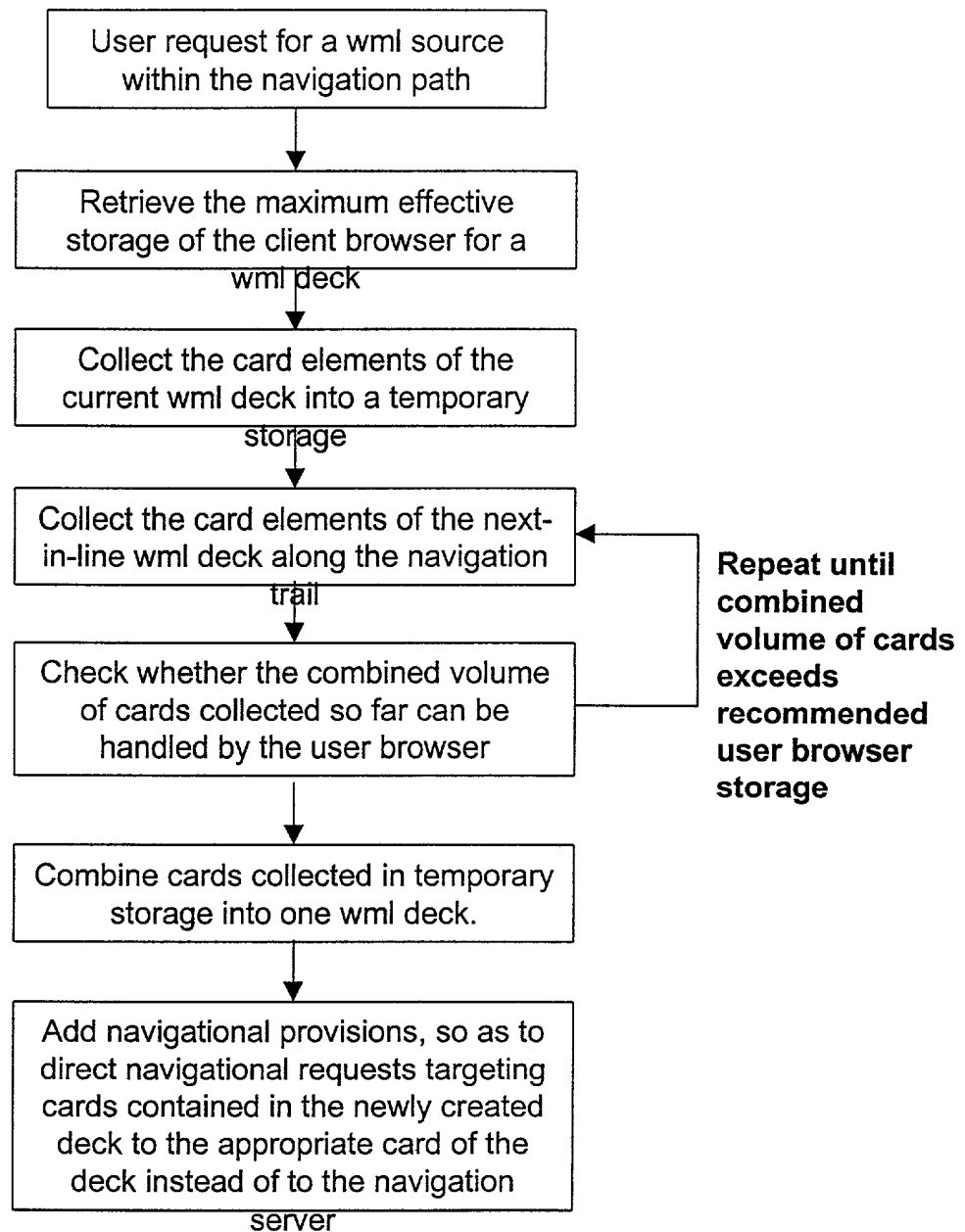


Fig. 15 – Process of acceleration
by way of WML deck contents concatenation



DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below my name,

I believe I am the original, first and sole inventor (if only one name is listed below), or an original, first and joint inventor (if more than one inventor's name is listed below), of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD OF NAVIGATING THROUGH CONTENT OF CELLULAR NETWORK

Title of Invention

the specification of which: ☒ is attached hereto was filed on _____ Application Serial No. _____
(for declaration not accompanying application)

with amendment(s) filed on _____
(date(s) of all amendments)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, s.1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, s.119/s.172 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

EARLIEST FOREIGN APPLICATION(S), IF ANY, FILED PRIOR TO THE FILING DATE OF THE APPLICATION			
APPLICATION NUMBER	COUNTRY	DATE OF FILING (Day, Month, Year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119/172
			Yes _____ No _____
			Yes _____ No _____
			Yes _____ No _____

I hereby claim the benefit under Title 35, United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code s.112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, s.1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NUMBER	FILING DATE	STATUS		
		PATENTED	PENDING	ABANDONED
60/209,726	June 5, 2000		<input checked="" type="checkbox"/>	

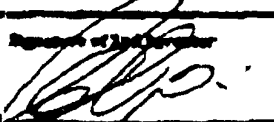
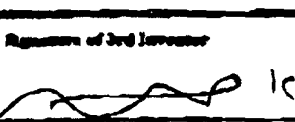
POWER OF ATTORNEY: As a named inventor, I hereby appoint Richard I. Samuel (Reg. No. 24,435), Patrice King (Reg. No. 44,833) and William Hwang (Reg. No.36,169) and Practitioners at Customer Number 24964 whose address is **Goodwin, Procter & Hoar LLP**, Seven Becker Farm Road, Roseland, New Jersey, 07068-1757 as my attorneys, to prosecute this application, and to transact all business in the U. S. Patent and Trademark Office connected therewith.

Send Correspondence To:

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Residence & Citizenship	City	State or Foreign Country	Country of Citizenship

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of any patent issuing thereon.

Signature of 1st Inventor	Signature of 2nd Inventor	Signature of 3rd Inventor	Signature of 4th Inventor
Kalish		 1c	
25/10/2000	Date 24.10.2000	Date 25.10.2000	Date

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